



**WHITE KNIGHT**  
.....engineer approved™

# PFH SERIES PUMPS

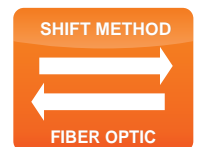
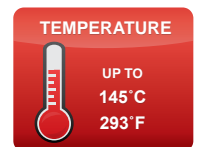
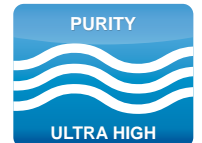
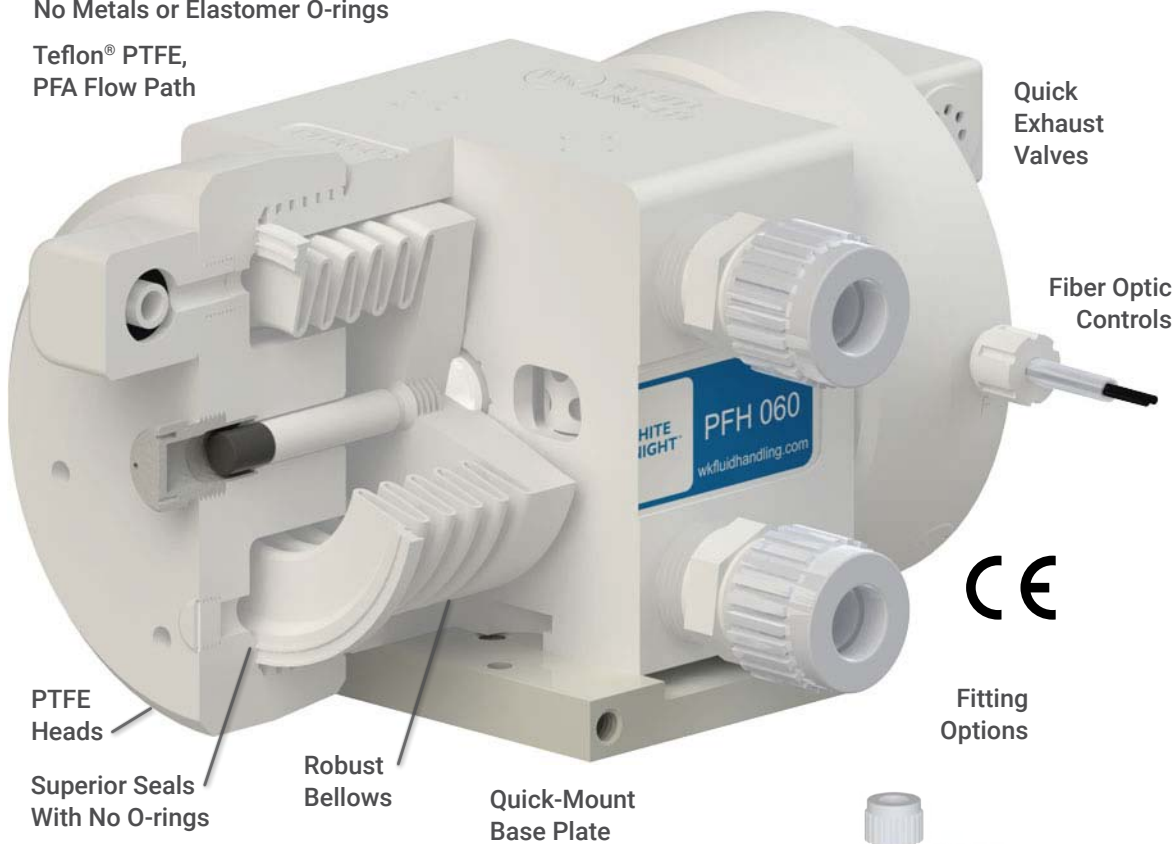
## Ultra-Pure Chemical Pumps with Fiber-Optic Sensors

Metal-free pumps with Teflon® PTFE, PFA flow paths for ultra-pure chemical process applications. PFH Series pumps are capable of up to 145°C (293°F) fluid temperatures and 5.5 bar (80 psi) air pressures. PFHSD models can run dry for more than one hour without pump damage.

### Advanced Pump Technologies

No Metals or Elastomer O-rings

Teflon® PTFE,  
PFA Flow Path



### Features & Benefits

- Process-safe Teflon® PTFE, PFA flow paths
- Contains no metals or elastomers
- Durable machined design with minimal parts
- Fiber-optic sensors provide optimal control
- Reliable, safe operation with leak-free seals and no O-rings
- Robust bellows allow for 5.5 bar (80 psi) supply pressure
- Lubricant-free shifting eliminates potential contamination
- No electric motors, which generate heat
- Class 100 cleanroom assembly, testing, and packaging
- No preventative maintenance during two-year warranty



### Industries

Semiconductor  
LEDs & Electronics  
Flat-Panel Displays  
Photovoltaic / Solar  
Aerospace

### Applications

Chemical Delivery  
Chemical Circulation  
Chemical Processing  
Chemical Reclaim  
Bulk Transport  
CMP Slurry

<https://wkfluidhandling.com/pfh-series/>

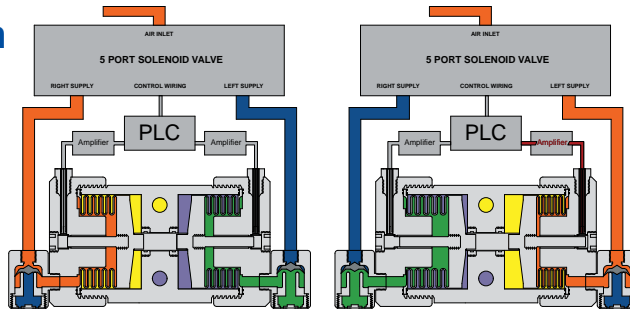




### Operation

A solenoid valve and fiber optics monitor stroke timing to optimize liquid flow and pump durability.

See online animation.



Supply air to left side

Supply air to right side

- Supply Air
- Ambient Air
- Liquid Out
- Exhaust Air
- Shift Signal
- Liquid In



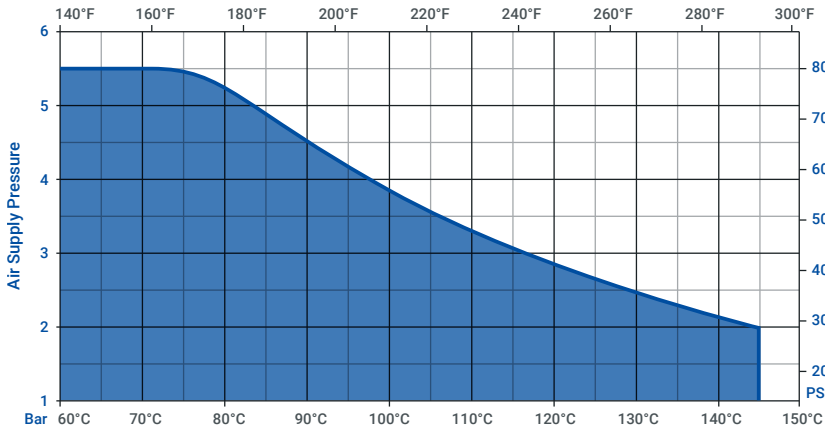
### Configuration

PFH 060 - F 12 - LF0 - SFD0 - T P 08 - A -

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ A (optional)

- ① **Pump Model**  
PFH = Standard  
PFHSD = Dry-run capable
- ② **Check ball material**  
blank (default) = PTFE  
F = PFA check balls
- ③ **Fitting Style**  
F = Flaretek® compatible  
T = Tube Out  
W = Weldable  
P = Pillar S-300®  
N = Female NPT (FNPT)
- ④ **Fitting Size**  
04 = 1/4 in  
06 = 3/8 in  
08 = 1/2 in  
12 = 3/4 in  
16 = 1 in  
20 = 1-1/4 in

### Temperature Limitations



### Specifications

Model	PFH030	PFH060	PFH140	
<b>Max Flow Rate*</b>	25.1 lpm (6.63 gpm)	63.9 lpm (16.88 gpm)	145.8 lpm (38.52 gpm)	
<b>Displacement Per Cycle*</b>	0.089 liters (0.024 gal)	0.216 liters (0.057 gal)	0.500 liters (0.132 gal)	
<b>Cycles per min</b>	≤ 336	≤ 318	≤ 235	
<b>Air Connection</b>	1/4 in FNPT	1/4 in FNPT	3/8 in FNPT	
<b>Weight</b>	3.6 kg (8.0 lb)	5.9 kg (13.0 lb)	17.2 kg (37.9 lb)	
<b>Suction Lift*</b>	≤ 1 m (3 ft)	≤ 1 m (3 ft)	≤ 1 m (3 ft)	
<b>Sound</b>	<b>Pressure**</b>	69.54 dB(a) 66.58 dB(a)	82.74 dB(a) 82.61 dB(a)	81.98 dB(a) 91.60 dB(a)
	<b>Power**</b>	58.44 dB(a) 65.52 dB(a)	71.92 dB(a) 73.84 dB(a)	76.37 dB(a) 83.16 dB(a)

<b>Stroke Detection</b>	Fiber optic with or without D10 sensor	<b>Max Fluid Temperature</b>	145°C (293°F)
<b>Leak Detection</b>	Fiber optic with or without sensor, or conductivity	<b>Max Supply Air Pressure</b>	5.5 bar (80 psi)
<b>Electronic Control</b>	CPC, CPT, or custom. Call for details.	<b>Min Startup Air Pressure</b>	1.4 bar (20 psi)
		<b>Fluid Path Materials</b>	PTFE, PFA
		<b>Non-Fluid Path Materials</b>	PTFE, PFA

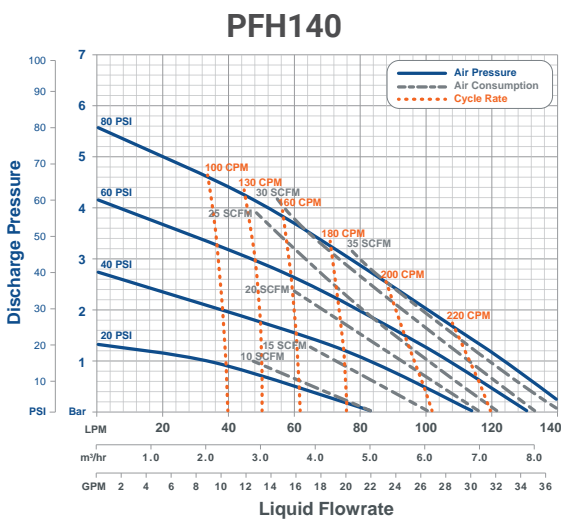
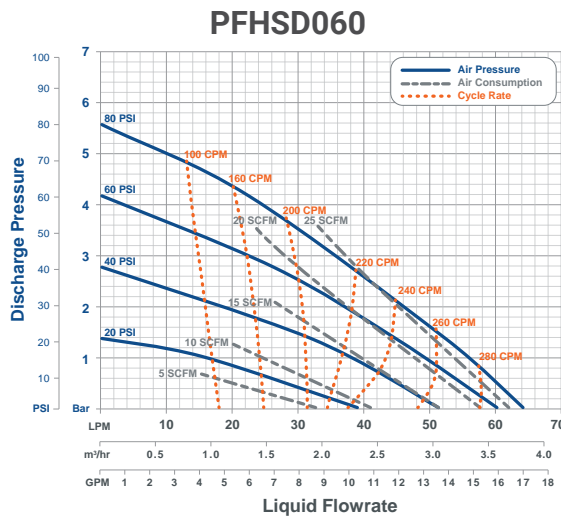
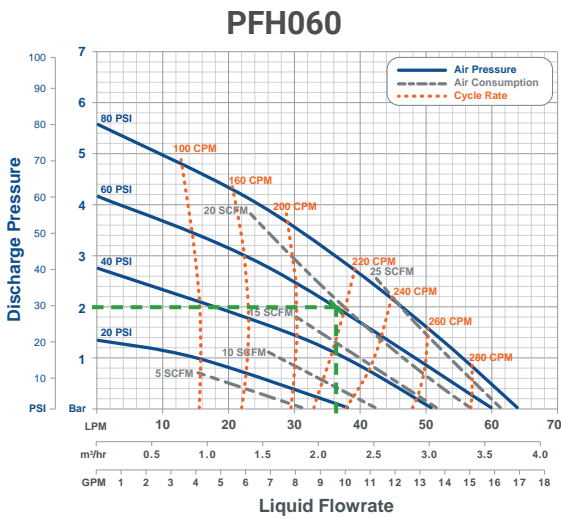
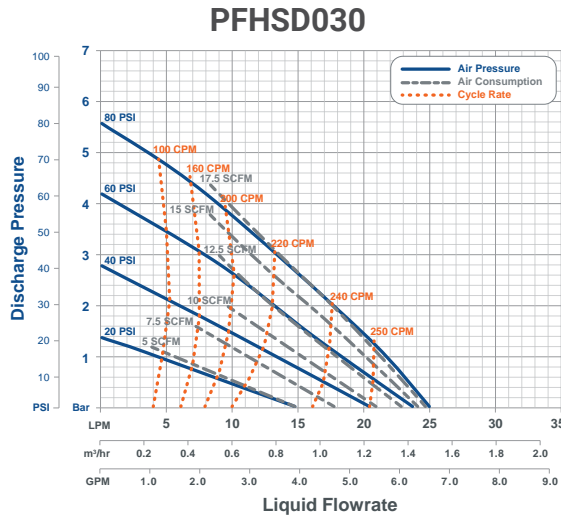
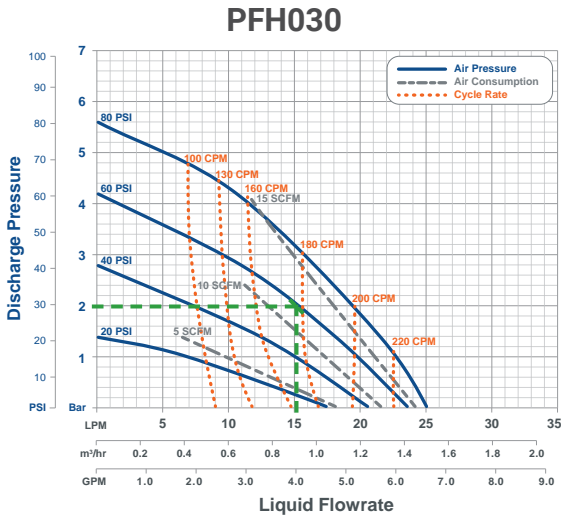
\* May vary by configuration and system. Suction lift diminishes over time. Recommended installation level less than 3 ft above source. To calculate displacement, divide flow rate by CPM.  
 \*\* dB at 80 psi 50 CPM (top) and 80 psi max. CPM (bottom). Sound levels measured in accordance with ISO9614-2:1997.  
 \*\*\*Dry-run capable PFHSD pumps require flooded suction, and may have a reduced warranty. Contact White Knight for details.

- ⑤ **Leak Detection** (optional)  
LF0 = 15 ft fiber optic cable, no amplifier  
LF1 = 15 ft fiber optic cable, D10 amplifier  
LF2 = 25 ft fiber optic cable, no amplifier  
LF3 = 25 ft fiber optic cable, D10 amplifier  
LC0 = 15 ft conductivity cable
- ⑥ **Stroke Detection (\*Required for operation)**  
*Dual Probe*  
SFD0 = 15 ft fiber optic cable, no amplifier  
SFD1 = 15 ft fiber optic cable, D10 amplifier  
SFD2 = 25 ft fiber optic cable, no amplifier  
SPD3 = 25 ft fiber optic cable, D10 amplifier  
*Single Probe, Dual Detect*  
SFD0 = 15 ft fiber optic cable, no amplifier  
SFD1 = 15 ft fiber optic cable, D10 amplifier  
SFD2 = 25 ft fiber optic cable, no amplifier  
SPD3 = 25 ft fiber optic cable, D10 amplifier
- ⑦ **Liquid Outlet Position**  
F = Front straight liquid outlet  
T = Top straight liquid outlet
- ⑧ ⑨ **Liquid Outlet Style and Size**  
Choices are same as ③ and ④ above
- ⑩ **Quick Exhaust/Air Inlet**  
A = 5/16 in NPT Adapter
- A **Revision level**  
Contact White Knight for copy exact information.

Define optional items only if desired. Define outlet fitting options (6-8) if they differ from inlet fitting options (2)(3). All fittings are not available in all sizes, and all fittings are not compatible with all pump sizes. Call for details. Operating pump in timer mode requires end-of-stroke detection to prevent over stroking. Operating a pump in timer mode without stroke detection voids the warranty. Operating pump without quick exhaust valves voids warranty. Customers may use NPT adapter and supply their own QEVs.



**Performance**



**Reading Charts**

Draw a horizontal line from your discharge pressure and a vertical line through your desired flow rate. At their intersection, estimate required air supply pressure, cycle rate and air consumption.

See green dashed lines in PFH030 and PFH060 charts for examples.

**Example 1**

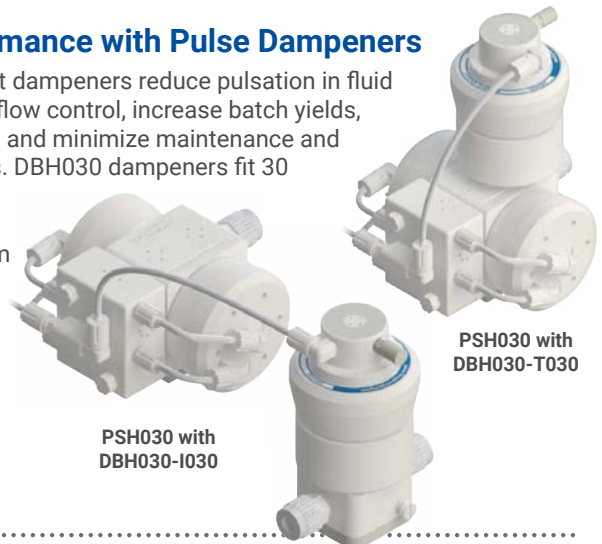
At 2 bar (30 psi) liquid discharge pressure and 60 psi supply pressure, PFH030 pumps provide 15 lpm (4 gpm) liquid flow rate. They would cycle at 175 CPM, and exhaust 12 SCFM of air.

**Example 2**

At 2 bar (30 psi) liquid discharge pressure and 60 psi supply pressure, PFH060 pumps provide 36 lpm (9.8 gpm) flow rates. They would cycle at 215 CPM and exhaust 19 SCFM of air.

**Improve Performance with Pulse Dampeners**

In-line and top-mount dampeners reduce pulsation in fluid systems to improve flow control, increase batch yields, protect components, and minimize maintenance and downtime for repairs. DBH030 dampeners fit 30 and 60 lpm pumps. DBH060 dampeners fit 30, 60 and 140 lpm pumps. DBH140 dampeners fit 60 and 140 lpm pumps.



\*Graph is for reference only. Performance was measured utilizing 1/2 in (3/8 in ID) air line and 1-1/4 in (1-1/8 in ID) liquid lines with 1 ft flooded suction. Performance may vary in your system.

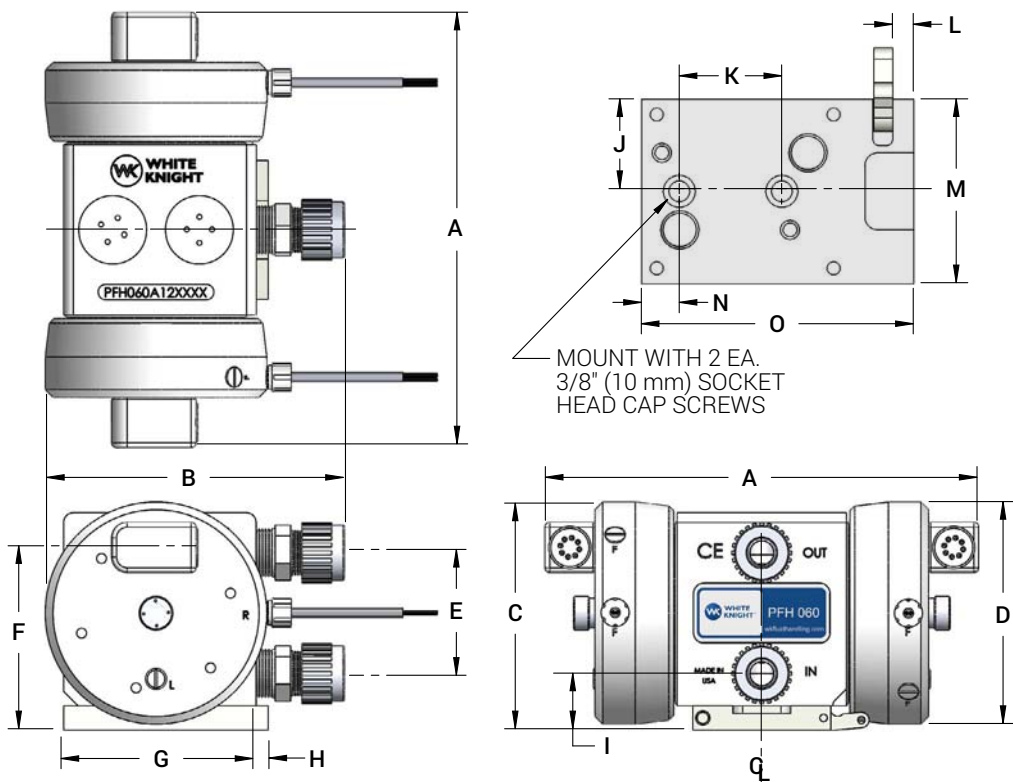
**Dimensions**

mm (inches)

	PFH030	PFH060	PFH140
A	263 (10.4)	287 (11.3)	383 (15.1)
B	154 (6.1)	197 (7.7)	277 (10.9)
C	121 (4.8)	150 (5.9)	235 (9.2)
D	∅116 (4.6)	∅146 (5.8)	∅225 (8.9)
E	57 (2.2)	79 (3.1)	138 (5.4)
F	100 (3.9)	120 (4.7)	192 (7.6)
G	100 (3.9)	127 (5.0)	206 (8.1)
H	8 (0.3)	8 (0.3)	8 (0.3)
I	32 (1.3)	37 (1.5)	53 (2.1)
J	31 (1.2)	46 (1.8)	47 (1.8)
K	51 (2.0)	51 (2.0)	51 (2.0)
L	11 (0.4)	10 (0.4)	11 (0.4)
M	62 (2.5)	91 (3.6)	94 (3.7)
N	25 (1.0)	19 (0.7)	57 (2.2)
O	111 (4.4)	135 (5.3)	215 (8.4)

Rigid baseplate available. Call for details.

<https://wkfluidhandling.com/pfh/>



**White Knight Accessories**

**Ultra-Pure Closed-Loop Systems**

Automatically control flow or pressure with metal-free systems capable of 210°C, dead-head and suction lift!



Automatically maintain flow or pressure in ultra-pure chemical process and delivery systems. Simplify process automation to save time and resources, improve yields and reduce cost.

<https://wkfluidhandling.com/closed-loop/>

- ⊙ Up to 210°C (410°F)
- ⊙ No metals or elastomers
- ⊙ No heat generation
- ⊙ No O-rings or lubrication
- ⊙ Suction lift & dead-head

**Pulse Dampeners**

Reduce pulsation in fluid systems to improve flow control, increase yields, protect fittings and pipes, and minimize downtime for repairs.

<https://wkfluidhandling.com/dampeners/>



**Pressure Regulators**

Control upstream or downstream pressure! A single back-pressure regulator equalizes upstream fluid pressure across multiple discharge outlets. Forward-pressure regulators control downstream pressure.

<https://wkfluidhandling.com/regulators/>



**Cycle-Rate Translator**

The CPT enables pump replacements in existing tools. It operates a White Knight pump at its optimal cycle rate and scales the operational cycle rate to that expected by the tool.

<https://wkfluidhandling.com/cpt/>